AMENDMENTS TO THE CLAIMS

In the claims:

1. (Original) A method of forming a weld joint comprising the steps of:

performing a welding operation along a weld line to form a weld joint and heated regions along the surfaces of the workpieces; and

performing a compression operation to induce a deep layer of compression in the surfaces of the workpieces;

wherein the welding operation forms regions having an elevated surface temperature; and

wherein the compression operation is performed along the weld line and regions having an elevated surface temperature.

2. (Original) The method of claim 1 wherein the amount of surface cold working is less than about 2 percent.

3. (Original) The method of claim 1 wherein the amount of surface cold working is less than about 5 percent.

4. (Original) The method of claim 1 wherein inducing a deep layer of compression is performed using a burnishing process.

5. (Original) The method of claim 1 further comprising the step of passing a single-point compression tool in a predetermined pattern across the weld line to induce a desired compressive stress pattern having a selected amount of cold working and surface hardening.

6. (Original) The method of claim 1 wherein the welding operation and the compression operation are performed in a single pass.

7. (Currently Amended) The method of claim 1 further comprising the step of varying the amount of surface cold working to achieve a desired residual compressive stress ~~pattern~~.

8. (Original)The method of claim 1 further comprising the step of cooling a region along the surface of at least one workpiece prior to performing the compression operation.

9. (Original) The method of claim 1 further comprising the step of creating a surface temperature gradient within a region of a workpiece and performing the compression operation along the region.

10. (Original) A method of forming a weld joint comprising the steps of:

positioning at least two workpieces together forming a weld line;

performing a welding operation along the weld line to form a weld joint;

creating a surface temperature gradient within regions of the workpieces; and

performing a compression operation to induce a layer of residual compressive stress along the regions.

11. (Original) The method of claim 10 wherein the regions are heated to elevated temperatures.

12. (Original) The method of claim 10 wherein the regions are cooled to lower temperatures.

13. (Original) The method of claim 10 wherein the amount of cold working of the surface of the workpieces is less than about 5 percent.

14. (Original) The method of claim 10 wherein the amount of cold working of the surface of the workpieces is less than about 2 percent.

15. (Original) The method of claim 10, wherein the pattern of burnishing is controlled to induce a selected residual stress pattern along the surfaces of the workpieces.

16. (Original) The method of claim 10 wherein the welding operation and the compression operation are performed in a single pass.

17. (Currently Amended) An apparatus for forming a weld joint, the apparatus comprising:

means for performing a welding operation to weld at least two workpieces together; and

means for inducing a deep layer of compression within the surface of the workpieces;

means for creating a surface temperature gradient within regions of the workpieces; and

wherein said means for performing the welding operation is selected from the group consisting of gas welding, arc welding, resistance welding, thermite welding, laser welding, and electron-beam welding.

18. (Canceled)

19. (Original) The apparatus of claim 17 wherein said means for inducing a deep layer of compression within the surface of the weld joint comprises a burnishing device.

20. (Original) The apparatus of claim 17 further comprising a controller for automatically controlling the movement of said welding tool and the compression tool.

21. (Original) The apparatus of claim 17 further comprising means for depositing a coolant along the surfaces of the workpieces.

22. (Original) The apparatus of claim 17 further comprising means for heating selected regions of the surfaces of the workpieces.